Issue Paper Number **00-003**

BOARD OF EQUALIZATION
KEY AGENCY ISSUE

- ☒ Board Meeting
- ☐ Business Taxes Committee
- ☐ Customer Services and Administrative Efficiency Committee
- ☐ Legislative Committee
- ☐ Property Tax Committee
- ☐ Other

Valuation of Microprocessor-Controlled Telephone Switch Software

I. Issue

Should all software on storage media used in microprocessor-controlled telephone switches be subject to property tax assessment?

II. Staff Recommendation

Staff recommends that all software on storage media used in microprocessor-controlled telephone switches be subject to property tax assessment. This recommendation is based on a legal opinion (Attachment 1) provided by the Board's legal staff that section 995 of the Revenue and Taxation Code (R&T Code) (Attachment 2) does not apply to telephone switches controlled by microprocessors embedded in the switches.

III. Other Alternative(s) Considered

Alternative 1

Continue staff's current practice of excluding from property tax assessment certain software on storage media that are used in micrprocessor-controlled telephone switches. Current practice excludes from assessment software identified as "application program" software by the taxpayer in the Property Statement, subject to verification by staff in the office or through audit. This verification is based on confirming that the software excluded is not needed for the basic operation of the switches.

Alternative 2

Apply Rule 152 (Attachment 3) to exclude certain software on storage media that are used in microprocessor-controlled telephone switches. Rule 152 excludes software that is not included in the sale or lease price of computer equipment if (1) the equipment and the software are sold or leased at a single price, or (2) the purchase or lease documents set forth separate prices for the equipment and the software, but the software may not be accepted or rejected at the option of the customer.

Alternative 3

Exclude from assessment all software on storage media that are used in microprocessor-controlled telephone switches. No distinction is made between "basic operational program" software and "application program" software embedded in telephone switches.

IV. Background

The assessment of microprocessor-controlled telephone switches became an issue when they replaced older switches that were mechanically controlled. Software embedded in microprocessors controls the operation of the newer switches. Historically, staff has placed no value on software on storage media embedded in telephone switches when the taxpayer identified it as "application program" software. This was based on Valuation Division staff's interpretation of section 995 of the R&T Code. For the cellular industry, a negotiated settlement agreement allowed a deduction of 25 percent of the historical cost of switches as "application program" software in storage media.

With the expiration of the Master Settlement Agreement and the Settlement Agreement between the Board and the Cellular Telephone Carriers, the Valuation Division requested an opinion from the Legal Division on the assessment of software on storage media embedded in microprocessor-controlled telephone switches. Staff from the Legal Division advised the Valuation Division that section 995 of the R&T Code does not apply to special purpose equipment such as microprocessor-controlled telephone switches. The legal staff provided the Valuation Division with an opinion that section 995 applies only to general purpose computers such as mainframe computers, mini-computers, and desktop computers. Special purpose equipment controlled by microprocessors should be assessed without regard to section 995 of the R&T Code or Property Tax Rule 152.

On January 7, 2000, the Valuation Division sent a letter to all state assessees that informed them of the legal opinion and the fact that staff plans to make no allowance or deduction for telephone switch software when developing value indicators for lien date 2000. Assessees were informed that, if they disagree, they could present their views at the February 23, 2000 Board Meeting at which the Board will hear state assessees' presentations on capitalization rates and other factors and procedures affecting 2000-01 values of California state-assessed properties.

V. Staff Recommendation

A. Description of the Staff Recommendation

Staff recommends that section 995 of the R&T Code not be applied to software on storage media used in microprocessor-controlled telephone switches. All software used in telephone switches should be subject to property tax assessment.

B. Pros of the Staff Recommendation

- Will eliminate the difficult task of applying the "basic operational program" and "application program" categories to software in special purpose equipment such as telephone switches.
- Will provide consistent treatment of all state assessees with respect to the valuation of microprocessor-controlled telephone switches, regardless of reporting practices.
- Will restrict the application of section 995 of the R&T Code to the general purpose computer context anticipated by the Legislature.
- Will decrease reporting requirements for assessees.
- Will be easy to administer.

C. Cons of the Staff Recommendation

- Will constitute a change from current practice.
- Will increase the appeal workload and the risk of litigation in the future.

D. Statutory or Regulatory Change

Depending on the interpretation, section 995 of the R&T Code and Property Tax Rule 152 may have to be amended to exclude microprocessor-controlled telephone switches.

E. Administrative Impact

Will eliminate the need for auditing software accounts of telecommunications companies. This will allow auditors to shift focus to other issues and areas.

F. Fiscal Impact

1. Cost Impact

None.

2. Revenue Impact

See Revenue Estimate attached.

G. Taxpayer/Customer Impact

Reporting requirements for taxpayers will decrease.

H. Critical Time Frames

A Board decision by February 23, 2000 is needed to allow time to implement proposed changes for the 2000 lien date.

VI. Alternative 1

A. Description of the Alternative

Continue staff's current practice of excluding from property tax assessment certain software on storage media that are used in micrprocessor-controlled telephone switches. Current practice excludes from assessment software identified as "application program" software by the assessee in the property statement, subject to verification by staff in the office or through audit. This verification is based on confirming that the software excluded from assessment is not needed for the basic operation of the switches.

B. Pros of the Alternative

- Would be consistent with the current assessment practice for microprocessor-controlled telephone switches.
- Would take a conservative approach in applying exemption statutes in a context not anticipated by the legislature when section 995 of the R&T Code was enacted.

C. Cons of the Alternative

- Would be difficult to segregate the software on storage media in special purpose equipment such as telephone switches into "basic operational program" and "application program" categories.
- Would require the development of standards for identifying "application program" software embedded in microprocessor-controlled telephone switches.
- Would define "basic operational program" software in a different way from that utilized by local assessors in assessing general purpose computers.
- Would result in inconsistent reporting among assessees. Reporting of "application program" software would depend on the interpretation of the assessee.

D. Statutory or Regulatory Change

None.

E. Administrative Impact

Staff resources would be needed to:

- Perform more verification audits.
- Develop specific criteria and reporting instructions for assessees in reporting "application program" software to promote consistent and uniform application.

F. Fiscal Impact

1. Cost Impact

None.

2. Revenue Impact

See Revenue Estimate attached.

G. Taxpayer/Customer Impact

None.

H. Critical Time Frames

A Board decision by February 23, 2000 is needed to allow time to implement proposed changes for the 2000 lien date.

VII. Alternative 2

A. Description of the Alternative

Apply Rule 152 to exclude certain software on storage media that are used in microprocessor-controlled telephone switches. Rule 152 excludes software that is not included in the sale or lease price of computer equipment if (1) the equipment and the software are sold or leased at a single price, or (2) the purchase or lease documents set forth separate prices for the equipment and the software, but the software may not be accepted or rejected at the option of the customer.

B. Pros of the Alternative

- Would be consistent with the application of section 995 of the R&T Code by local assessors in assessing general purpose computers.
- Would establish a "bright-line" test to distinguish between "basic operational program" and "application program" software.

C. Cons of the Alternative

- Would result in the application of Rule 152 to special purpose equipment such as microprocessor-controlled telephone switches. Rule 152 was designed for general purpose computers.
- Could favor large taxpayers with the ability to structure purchases so that a large portion is billed separately as "application program" software.

D. Statutory or Regulatory Change

None

E. Administrative Impact

None

F. Fiscal Impact

1. Cost Impact

None.

2. Revenue Impact

See Revenue Estimate attached.

G. Taxpayer/Customer Impact

None

H. Critical Time Frames

A Board decision by February 23, 2000 is needed to allow time to implement proposed changes for the 2000 lien date.

VIII. Alternative 3

A. Description of the Alternative

Exclude from assessment all software on storage media that are used in microprocessor-controlled telephone switches. No distinction is made between "basic operational program" and "application program" software embedded in telephone switches.

B. Pros of the Alternative

- Would eliminate the difficult task of applying the "basic operational program" and "application program" software categories to software in special purpose equipment such as telephone switches.
- Would provide consistent treatment to all assessees in the valuation of microprocessor-controlled telephone switches regardless of reporting practices.
- Would be easy to administer.

C. Cons of the Alternative

- Would be inconsistent with current practice.
- Would fail to comply with the distinction between "operational program" and "application program" software set forth in section 995 of the R&T Code.
- Would extend the exemption of "application program" software to a technology not anticipated by the legislature when section 995 of the R&T Code was enacted.

- Would exempt all software on storage media used in microprocessor-controlled telephone switches. This could lead to similar treatment of software embedded in microprocessors of other special purpose equipment.
- Could increase the risk of litigation from counties.

D. Statutory or Regulatory Change

Section 995 of the R&T Code and Rule 152 may have to be amended to specify that no distinction is made between "basic operational program" and "application program" software in microprocessor-controlled telephone switches. Both categories of software would receive the valuation treatment specified in section 995 of the R&T Code.

E. Administrative Impact

None

F. Fiscal Impact

1. Cost Impact

None

2. Revenue Impact

See Revenue Estimate attached.

G. Taxpayer/Customer Impact

Reporting requirements for taxpayers would decrease.

H. Critical Time Frames

A Board decision by February 23, 2000 is needed to allow time to implement proposed changes for the 2000 lien date.

Prepared by: Property Tax Department, Valuation Division

Current as of: February 4, 2000.

BOARD OF EQUALIZATION
REVENUE ESTIMATE

ISSUE #00-003
Valuation of Microprocessor-Controlled Telephone Switch Software

Proposal

Staff recommends that all software on storage media used in microprocessor-controlled telephone switches be subject to property tax assessment.

Background, Methodology, and Assumptions

Until now certain software on storage media that is used in microprocessor-controlled telephone switches has been excluded from property tax assessment. Recently the Board's Legal Division advised the Valuation Division that section 995 of the Revenue and Taxation Code applies only to general purpose computers and does not apply to telephone switches controlled by microprocessors embedded in the switches. Legal also stated that the cost of software in the storage media embedded in the switches should be included when calculating cost-based indicators of value for the switches.

By and large, mechanically controlled telephone switches have been replaced with microprocessor-controlled switches. The operation of these newer switches is controlled by software embedded in microprocessors. Until now in calculating cost-based indicators of value, embedded software identified as "application program" software by telephone companies has been excluded from property tax assessment while all other embedded software was assumed to be "basic operational program" software needed for the basic operation of the switches and subject to assessment.

After adjusting switch software costs reported for lien date 1999 for growth, Valuation staff estimates that the value of switch software for lien date 2000 is:

Cellular companies and interexchange companies	$640 million
Local exchange companies	$820 million

In the past, only the cellular and interexchange companies claimed the exclusion for "application program" software as non-"basic operational program" software. Since local exchange

companies have not claimed this exclusion, the value of their switches would not be affected under the recommendation. Based on statistics derived from prior audits, about 50 percent of the switch software for cellular and interexchange companies typically is reported as "application program" software. The estimated value of claimed "application program" software for lien date 2000 for these telephone companies is then $640 million x 50 percent, or $320 million. Under the staff recommendation, this software would be subject to assessment and property tax revenues at the basic one percent tax rate would increase by about $320 million x one percent, or $3.2 million, in 2000-01. Since this is a rapidly growing sector with growth rates in the 15 to 20 percent range in the last two years, it is likely that the annual revenue increases will be significantly higher in the future.

Staff also considered three alternative proposals.

Alternative 1

This proposal would continue the practice of excluding from assessment the value of software claimed to be "application program" software. As mentioned above, local exchange companies have not claimed an exclusion for "application program" software in the past; however, there would be a significant revenue impact if they did claim the exclusion in the future. Assuming that the 50 percent proportion for "application program" software also holds for local exchange companies, the estimated value for "application program" software for these telephone companies is $820 million x 50 percent, or $410 million. The maximum potential revenue decrease under this proposal is then $410 million x one percent, or $4.1 million, if the local exchange companies start claiming the "application program" software exclusion.

Alternatives 2 and 3

Under alternative 2, all switch software except bundled software would not be subject to property tax assessment. Under alternative 3, none of the switch software would be assessed.

Until now the cost of reported "basic operational program" software for the switches has been included in calculating cost-based indicators of value. Under alternative 3, all switch software, including both reported "basic operational program" software and "application program" software, would not be assessable. For cellular and interexchange companies, switch software is comprised of 50 percent reported "basic operational program" software, which will no longer be assessed under this alternative, and 50 percent reported "application program" software, which has already been excluded from assessment. The estimated value of the affected switch software under alternative 3 for cellular companies and interexchange companies amounts to $640 million x 50 percent for reported "basic operational program" software, or $320 million in 2000-01.

Local exchange companies, up to now, have not claimed an exclusion for switch software. It is likely that they would, however, under alternative 3 since all switch software, instead of only "application program" software, would then be excluded. From above, the total value of switch software for these companies amounts to about $820 million and would increase the total excluded value for telephone companies to $1.14 billion.

Under alternative 3, property tax revenues at the basic one percent tax rate would decrease by $1.14 billion x one percent, or $11.4 million, in 2000-01. It is likely that the annual revenue decrease will be significantly greater in the future.

Staff was unable to pinpoint the amount of bundled vs unbundled switch software in order to estimate the impact of alternative 2. However, staff believes that bundled software constitutes no more than 25 percent of all switch software. Staff also believes that, if alternative 2 were adopted, assessees would require switch vendors to separately identify all software costs so that, in the long run, all switch software would be unbundled. Assuming that bundled software is assessed and constitutes 25 percent of all switch software in 2000-01, the total affected value under alternative 2 amounts to 75 percent of the value affected under alternative 3 or $855 million [75 percent x $1.14 billion]. Property tax revenues at the basic one percent tax rate would decrease by $855 million x one percent, or $8.55 million, in 2000-01. In subsequent years, it is likely that the annual revenue decrease will grow to match that of alternative 3.

Revenue Summary

The impact in 2000-01 on property tax revenues at the basic one percent tax rate for the staff recommendation and the three alternative proposals is:

Staff recommendation All switch software is taxable	$3.2 million increase
Alternative 1 Only reported "basic operational program" software is taxable	Maximum $4.1 million decrease if local exchange companies claim the exclusion for "application program" software.
Alternative 2 Only bundled software is taxable	$8.55 million decrease
Alternative 3 All switch software is not taxable	$11.4 million decrease

Since this industry includes sectors that are experiencing rapid growth and technological changes, it is likely that the annual difference under any of these proposals will be significantly greater in the future.

Preparation

This revenue estimate was prepared by Aileen Takaha Lee, Statistics Section, Agency Planning and Research Division. The estimate was reviewed by Ms. Laurie Frost, Chief, Agency Planning and Research Division, and by Mr. Harold Hale, Chief, Valuation Division, Property Taxes Department. For additional information, please contact Ms. Lee at 445-0840.

Current as of February 4, 2000.

State of California

Board of Equalization
Legal Division-MIC: 82

Memorandum

To : Mr. Harold Hale - MIC:61

Date: January 13, 2000

From : Robert W. Lambert

Subject: The Valuation of Microprocessor-Controlled Telephone Switches and Similar State-Assessed Special Purpose Equipment Containing Embedded Systems

This is in response to your request that we provide a written confirmation of our advice to the Valuation Division with respect to the valuation of microprocessor-controlled telephone switches and similar state-assessed special purpose equipment containing embedded systems. As pointed out, telephone switches were mechanically driven in the past. Currently produced telephone switching equipment, however, is controlled by microprocessors in embedded systems.

The Valuation Division poses two questions: (1) Does section 995 of the Revenue and Taxation Code apply to the valuation of the storage media present in special purpose equipment such as microprocessor-controlled telephone switches containing embedded systems – or just to the valuation of the storage media in general purpose computers; and, (2) In calculating cost-based indicators of value for special purpose equipment such as microprocessor-controlled telephone switches containing embedded systems, should the Valuation staff include the total cost of placing such equipment into productive use, including the cost of the software in the storage media in the embedded systems?

These are essentially questions of first impression. Due in part to the fact that these types of devices were not in widespread commercial use in the early 1970's, it does not appear that the Legislature gave them any thought or consideration in enacting section 995. Furthermore, the subject of embedded software and special purpose equipment was not raised either when the Board originally enacted or subsequently amended Property Tax Rule 152. Finally, no court has addressed these questions.

Based upon the facts and reasoning set forth below, in my opinion, section 995 only applies to the valuation of the storage media present in general purpose computers such as mainframe computers, mini-computers, and desktop computers. Thus, special purpose equipment such as microprocessor-controlled telephone switches should be valued without regard to either section 995 or Property Tax Rule 152. In other words, any storage media embedded in such special purpose equipment should be valued inclusive of the software on such media; or, stated another way, by assuming the presence of such software on the media. Accordingly, cost-based indicators of value for such special purpose equipment

should be calculated so as to include all the costs of placing the equipment into productive use, including the cost of the software in the storage media in the embedded systems.

BACKGROUND INFORMATION

Technological Background

The history of the computer is summarized in *Kenneth P. Hahn v. State Board of Equalization* (1999) 73 Cal. App.4th 985, 988-989:

> In 1946, J. Presper Eckert and John William Mauchley developed the first high-speed electronic digital computer, the ENIAC. It filled a thirty-by-fifty foot room and weighed thirty tons. It had 18,000 vacuum tubes, 70,000 resistors, and 5 million soldered joints. Information was fed to it by turning a series of dials until they corresponded to the correct digits . . . . The following year, Eckert and Mauchley built the EDVAC, the first computer with electronically-stored programs. Following the invention of the transistor in 1947, transistors replaced vacuum tubes, and by 1956, there was a second generation of smaller, faster, more reliable, and more energy-efficient computers. Integrated circuits were invented in 1958. By the 1960's, programming languages had been developed, and the creation of the "stored program concept" meant that instructions to run a computer for a specific function (known as a program) were stored in the computer's memory, where they could be quickly replaced by a different set of instructions for a different function. With the development of integrated circuits, semiconductors, and the microprocessor (by Intel in 1971), computers got smaller and smaller.

Following on the heels of the development of the general-purpose computer was the development of digitally controlled equipment and machinery. In 1968, the Volkswagen 1600 used a circuit board in its fuel injection system launching the first embedded system in the automotive industry. Today, more than a dozen automotive systems are monitored and controlled by microcontrollers.[1] For instance, the steering, transmission, power seat, electronics, and restraint units may be controlled by embedded modules.

An embedded system is an integral part of an item of equipment or machinery. Without the embedded system, the equipment or machinery will not operate or be functional. Typically, an "embedded system is housed on a single micrprocessor board with the programs stored in ROM [read only memory]. Virtually all appliances that have a digital interface – watches, microwaves, VCRs – utilize embedded systems. (*Webopedia* (http://webopedia.internet.com/TERM/e/embedded_system.html).)

---

[1] A microcontroller is a single chip that contains a processor, RAM, ROM, clock, and I/O [input/output] control unit. These devices are widely used to control appliances, equipment, and machinery. (*TechEncyclopedia* (http://www.techweb.com/encyclopedia).)

Microcontrollers are "moving truly into the consumer price domain, and becoming embedded in a high range of . . . products. Most top of the range cars have more than 50 embedded microprocessors." (*The Institute of Electrical Engineers* (http:// www.iee.org.uk/lectures).) In fact, Forbes Magazine in June this year estimated that 99 percent of all microprocessors go into embedded systems, not into PCs. Thus, it is not surprising to find that embedded systems are commonly found in such items as: airplanes, vessels, office equipment, cameras, relays, transmitters, radio and broadcast equipment, drill presses, milling machines, automotive repair equipment, petroleum refineries, electrical-power distribution systems, printing presses, robotics, and manufacturing equipment.

Pursuant to the above, while this memorandum addresses only telephone switches and similar state-assessed special purpose equipment[2] containing embedded systems, embedded systems are commonly found in many types of machinery, equipment, and appliances subject to both state and local assessment.

The Cellular Telephone Settlement Agreement

Paragraph 2.5 of the form Settlement Agreement between the Board and the cellular telephone carriers, provides as follows as to the software embedded in switching equipment:

> In establishing the assessments described in [this settlement agreement] an amount equal to 25 % of the historical reported cost of switching equipment of the Company shall be treated as application software that is exempt from assessment.

While in some respects the 25 percent so-called exemption percentage represented a compromise between the cellular industry and the Board, the Board's Valuation staff's rationale in support of the use of such percentage was as follows:

1. Sections 995 and 995.2 provide that the "storage media" for "computer programs" are to be valued as if they contain no application programs, only basic operational programs.

2. While the statutory operational versus application dichotomy makes sense in the context of general purpose computers, it has little apparent relevance in the area of embedded systems for the following reasons:

    a. General purpose computers have basic operational programs to make them functional as general purpose computers. It is the application

---

[2] "Special purpose systems are those that are designed for and dedicated to specialized applications. For instance, a special purpose computer system might be utilized to control a manufacturing or a chemical process. General purpose systems . . . are those that are capable of easily and economically being adapted to a variety of data processing applications . . . . (*Transamerica Computer Co. v. IBM (1979) 481 F. Supp. 965, 977.)*

programs, however, that determine the specific function that actually will be performed; i.e., word processing, game playing, financial analysis, tax preparation, etc.

b. Special purpose machines like telephone switches that contain embedded systems typically do not utilize a separate and distinct basic operational program – and they are not amenable to various, discrete uses depending upon the type of application program that is loaded into their ROM. For instance, the embedded software in an airplane's guidance system has only one use; unlike a desktop unit, you cannot load a word processing application program onto it and change its functionality.[3]

c. Instead, the software in the embedded systems in special purpose equipment typically runs one single, highly specialized program; and that one program is usually real-time and in a continuous loop. Each software component will have one – and only one – function.

d. Thus, inasmuch as the software in embedded systems is specialized and single purpose, typically there is no need for a separate basic operational program that may run one or more discrete application programs. Consequently, the statutory operational versus application distinction that is applicable to general purpose computers has little relevance to special purpose equipment.

3. When the telephone switching embedded software issue came up during the settlement negotiations with the cellular industry, the Valuation staff decided that, if the operational/application dichotomy could be applied to such software at all it would be as follows: In the context of special purpose equipment like telephone switches, the word "operational" could be interpreted to mean all that embedded software necessary to operate the equipment for its intended purpose as a switch. Any embedded software in excess of that necessary to so productively operate the equipment as a switch could be considered to be an "application;" including such extras or "bells and whistles" as call waiting, answering service options, etc.

4. Given the above, the parties agreed, for settlement purposes only (and in such a manner that the Board was not contractually bound to follow the agreement), to treat 25 percent of the historical cost as exempt "application programs" under

---

[3] Some states make the following distinction: "A general purpose computer is one that can be reprogrammed to perform a variety of different jobs without physically dismantling and reconstructing the computer; whereas, a special purpose digital computer can be reprogrammed to do different jobs only by physically dismantling and reconstructing the computer. An example of a special purpose computer is a handheld calculator . . . . 'Special purpose' as applied to a digital computer means not readily adaptable to perform a variety of tasks or limited to a specific task." (*Greene v. Litton Indus.* (1980) 1980 U.S. Dist. LEXIS 14408, 14417-18.); "The general-purpose computer is designed to perform operations under many different programs." (*Gottschalk v. Benson* (1972) 409 U.S. 63, 65.); See Also *In re Warmerdam* (1994) 33 F.3d 1354.)

sections 995 and 995.2. The taxable balance of 75 percent included those "basic operational programs" necessary to make the switch function as a switch.[4]

5. Thus, the Valuation staff determined that, during the settlement agreement period, the 25 percent exemption amount could be used as a compromise position pending a review of the matter.

Now that the cellular telephone settlement period has expired, however, it is appropriate to re-visit the applicability – or inapplicability – of section 995 to microprocessor-controlled telephone switches that contain embedded systems.

Legal Background

Pursuant to section 995 of the Revenue and Taxation Code:

> Storage media for computer programs shall be valued... as if there were no computer program on such media except basic operational programs. Otherwise, computer programs shall not be valued for purpose of property taxation. (Emphasis added.)

Section 995.2 then defines the term "basic operational program" as follows:

> The term "basic operational program," as used in Section 995..., means a computer program which is fundamental and necessary to the functioning of a computer. A basic operation program is that part of an operating system including supervisors, monitors, executives and control or master programs which consist of the control program elements of that system.
>
> For purposes of this section the terms "control program" and "basic operational program" are interchangeable. A control program, as opposed to a processing program, controls the operation of a computer by managing the allocation of all system resources, including the central processing unit, main storage, input/output devices and processing programs. A processing program is used to develop and implement the specific applications which the computer is to perform. Its operation is possible only through the facilities provided by the control program; however, it is not in itself fundamental and necessary to the functioning of a computer.
>
> Excluded from the term "basic operational program" are processing programs, which consist of language translators, including but not limited to, assemblers and compilers; service programs, including but not limited to, data set utilities, sort/merge utilities, and emulators; data management systems, also know as

[4] At the time, the Valuation staff believed that the 25 percent exempted portion roughly corresponded to the embedded switch software that provided additional services beyond those minimally necessary to operate the switch as a switch.

> generalized file-processing software; and application programs including but not limited to payroll, inventory control and production control....
>
> A control program, as used in this section, includes such functions as: selection, assignment and control of input and output devices; loading of programs, including selection of programs from a system resident library; handling the steps necessary to accomplish job-to-job transition; controlling the allocation of memory; controlling concurrent operation of multiple programs or computers; and protecting data from being inadvertently destroyed as a result of operator program error. (Emphasis added.)

Thus, to summarize the above, the storage media for computer programs shall be valued for property tax purposes as if there were no computer programs on such media other than "basic operational programs." "Basic operational programs" are those that are "fundamental and necessary to the functioning of a computer."

With the above legal background in mind, we will now turn to the specific questions raised in your memorandum:

LEGAL OPINION

Question No. 1

Does Section 995 of the Revenue and Taxation Code apply to the valuation of the storage media present in special purpose equipment such as microprocessor-controlled telephone switches containing embedded systems – or just to the valuation of the storage media in general purpose computers?

For the reasons set forth below, my answer to this question is that section 995 only applies to general purpose computers, not to special purpose equipment such as telephone switches.

In my opinion, the term "computer" as used in sections 995 and 995.2 (and Property Tax Rule 152) was intended to cover only general purpose computers[5]; and not special purpose devices that, instead of operating mechanically, utilize a microprocessor and a set of embedded or "hard-wired" instructions to direct the device's actions.[6] While it might be argued that, in the field of computer science, the word "computer" can be interpreted technically to cover any machine with a microprocessor and memory, the cardinal or fundamental rule of statutory construction is the so-called intent of the legislature. And, in the case of these statutes, it is my opinion that, based upon the standard rules of statutory construction and interpretation, the legislature only intended that the statutes be applied to

---

[5] A "general purpose computer" is defined in the Microsoft Computer Dictionary (3d Ed., 1997) as "a computer that can perform any computational task. Each task depends on specific software."

[6] Taken in context, the phrase "or other machinery" as used in section 995 obviously refers to those peripheral devices that may be attached to a general purpose computer, such as monitors, printers, disk drives, hard drives, modems, and the like.

general purpose computers -- and not to mircoprocessor-controlled special purpose devices. The reasons for this opinion are set forth below:

1. The term "computer" should be construed in accordance with its common or ordinary meaning as a general purpose computer. Unless otherwise clearly intended or indicated, legislative enactments should be construed in accordance with the common or ordinary meaning of the language used. (*Smith v. Fair Employment and Housing Comm'n* (1996) 12 Cal.4th 1143.) In this case, under its common or ordinary meaning, the word "computer" refers only to general purpose computers, not to such items as microprocessor-controlled special purpose devices. In addition, when a word used in a statute has both a technical and a popular meaning, the word should be interpreted in accordance with its popular meaning unless the context indicates that the technical sense of the word was intended. (*Weill v. Kenfield* 54 Cal. 111; *Pasadena v. Railroad Com. of California* (1920) 183 Cal. 526.) Thus, even if the word "computer" has a special mathematical or computational meaning, in construing sections 995 and 995.2, it should be interpreted in accordance with common usage as the general purpose device with which we are all now familiar.

It is apparent from the opinion in *Kenneth Hahn v. SBE, supra,* that the appellate court understood the word "computer" to mean "general purpose computer" – and not some component part in an airplane or automobile. For instance, the court states that during a 20-year period, the "number of computers in use in the United States grew from about 500,000 to more than 50,000,000." (*Ibid.* at 995.) Quite obviously, this number is exclusive of the many millions of microcontrollers in special purpose devices and equipment. Thus, it is apparent that the court in *Hahn* understood the word "computer" to mean a general purpose computer, in keeping with its commonly understood meaning.

2. The word "computer" should be construed in accordance with its settled legal meaning as a general purpose computer. A word having a settled or well-known legal meaning should be construed to have that meaning when used in a statute. (*Ventura County Deputy Sheriffs' Ass'n v. Board of Retirement of Ventura County Employees' Retirement Ass'n* (1997) 16 Cal.4th 483.) In researching the legal meaning of the word "computer," I made several queries to California statutory and case databases. In response, the databases displayed hundreds of instances of the use of the word "computer" -- by both the courts and the legislature -- in the "general purpose computer" sense of the word. Thus, it is my opinion that it is well-settled legally that, when used in a statute or appellate opinion, the word "computer" is to be normally interpreted in the common or ordinary use of the word.

3. A consideration of the language used in sections 995 and 995.2, taken as a whole, demonstrates that their provisions were intended to apply only to general purpose computers. The intent of the legislature in enacting a statute may be gathered from the words and language used. (*Grubb & Ellis Co. v. Bello* (1993) 19 Cal.App.4th 231.) In analyzing the words utilized, however, the entire statute should be examined, not just isolated parts or words. (*DuBois v. W.C.A.B.* (1993) 5 Cal.4th 382.) In analyzing sections 995 and 995.2, and Property Tax Rule 152, I note that none of the language or examples used either mention or have any application to microprocessor-controlled special purpose

devices. Further, I note that the words and phrases used all have specific application to general purpose computers; such words and phrases include (i) "punched cards, tapes, discs, or drums;" (ii) "processing programs;" (iii) "specific applications;" (iv) "language translators;" (v) "assemblers and compilers;" (vi) "data set utilities, sort/merge utilities, and emulators... data management systems;" (vii) "application programs including but not limited to payroll, inventory control and production control;" and (viii) "application programs." These words and phrases have no significance except with respect to general purpose computers. In other words, these words and phrases have no general significance to special purpose devices with embedded single-purpose programs that typically:

- Have one -- and one only -- dedicated function, such as providing graphics for a flight simulator. Language translators, utilities, or even the concept of various potential specific applications are meaningless for such single-purpose machines.

- Operate on an essentially continuous or "looping" basis, with virtually no human control during normal operations, such as aircraft guidance systems.

- Operate at "real-time," such as transaction-processing systems and scientific applications.

For general purpose computers, the "basic operational program" is the software that interconnects the general purpose hardware with the various application programs that may be run on such hardware.[7] Special purpose devices, on the other hand, are machines that are designed with one particular purpose in mind. As previously indicated, the "microprocessor-controlled" portion of the special purpose device is typically referred to as an "embedded system." An "embedded system" may also be defined as follows:

> Hardware and software which forms a component of some larger system [i.e., a telephone switch, an automobile, a digitally-controlled machine tool or lathe, etc.] and which is expected to function without human intervention. A typical embedded system may include some kind of operating system but often it will be simple enough to be written as a single program. It will not usually have any of the normal peripherals such as a keyboard, monitor, serial connections, mass storage, etc. or any kind of user interface unless these are required by the overall system of which it is a part. Often it must provide real-time response. (*FOLDOC Computer Dictionary*, Microsoft Internet Explorer.)

---

[7]Section 995.2 of the Revenue and Taxation Code defines the term "basic operational program" as the program that "controls the operation of a computer by managing the allocation of all system resources, including the central processing unit, main storage, input/output devices and processing programs." The Microsoft Computer Dictionary defines the term "operating system" in similar terms as the "software that controls the allocation and usage of hardware resources such as memory, central processing unit (CPU), disk space, and peripheral devices. The operating system is the foundation on which applications are built. (Emphasis added.)" (*Ibid.*)

Thus, since the words and phrases used in sections 995 and 995.2 all appear to relate solely to general purpose computers – and not to microprocessor-controlled special-purpose devices – it is logical to conclude that these words and phrases should be construed so as to apply only to general purpose computers.

4. Sections 995 and 995.2 – and, accordingly, Property Tax Rule 152 -- should be interpreted so as to avoid the absurd result of trying to apply such concepts as "basic operational programs" and "application programs" to special purpose devices as to which these terms have little relevance. Statutes should be construed so as to avoid absurd results. (*Roberts v. City of Palmdale* (1993) 5 Cal.4th 363.) The central distinction that is made in the relevant statutes, and in the Board's implementing rule, is between two types of computer programs: "operational" versus "application." This distinction is understandable with respect to general purpose computers that may come with a "BIOS," an operating system, and various application programs. Thus, read in the context of the normal use of the word "computer," the language used in these provisions is relatively straightforward. But the software embedded in most microprocessor-based special purpose devices has only one dedicated function and generally does not come equipped with a separate operating system. As a consequence, it would be very difficult -- if not impossible -- to logically apply the operational/application distinction to such devices. For example, how can the software embedded in a airplane's control panel and guidance system be divided between the "operational" and the "application?" The device has one and only one purpose or function. To even attempt to apply such a distinction to single purpose machines is absurd; in fact, it is absurd to even try to apply a "computer" statute to such special purpose devices. Regardless of whether or not it comes equipped with microprocessors or memory, a airplane is an airplane -- not a computer.

5. The legislative history of sections 995 and 995.2, and the administrative record of Property Tax Rule 152, make it clear that these provisions were intended to apply only to general purpose computers. Legislative history may also be reviewed to determine legislative intent. (*City of San Jose v. Superior Court* (1993) 5 Cal.4th 47.) In this case, a review of the legislative history of the statutes, and of the administrative record of the rule, indicates that the "computers" addressed therein were considered to be common general purpose computers. There is no mention of microprocessor-controlled special purpose devices. In addition, as such microprocessor-controlled special purpose devices were not widely distributed in 1972 and 1973, it is extremely unlikely that the Legislature could have had them in mind in enacting section 995.

The computer industry has argued that the legislative intent behind section 995 was that only the "operational" software which was, at that time, "presently being assessed and taxed in the various counties continue to be assessed and taxed during the effective period of this act." (See A.B. 438, Statement of Legislative Intent.) The *Hahn* decision also states that "the Legislature intended 'basic operational programs' to refer only to programs being assessed in the various counties as of 1972." (*Ibid.* at 995.) To the extent that microprocessor-controlled special purpose devices were in circulation in 1972-1973, it does not appear that any deductions were being made from the property tax valuation of such equipment due to the presence of embedded software. Thus, if any such special

purpose devices were being assessed in 1972-1973, then their embedded software was also being "assessed and taxed."

Pursuant to the above, regardless of when they came into widespread commercial circulation, it does not appear to have been the intention of the Legislature to apply the property tax exclusion for "storage media" containing "application" software to microprocessor-controlled special purpose devices.[8]

Given my opinion that the word "computer" as used in section 995 and related provisions does not apply to microprocessor-controlled special purpose devices such as telephone switches, it is also my opinion that the so-called "application software exemption" has no application to telephone switches. Furthermore, as to any alleged "intangible" argument that may be raised, Revenue and Taxation Code section 110 provides as follows: "Taxable property may be assessed and valued by assuming the presence of intangible assets or rights necessary to put the taxable property to beneficial or productive use. (Emphasis added.)" In fact, it is not even clear that installed microprocessor code constitutes an intangible in the first place. (See Rev. & Tax. Code §995; *South Central Bell Telephone Co. v. Barthelemy* (1994) 643 So.2d 1240, 1243-1246; *Chittenden Trust Company v. King* (1983) 465 A.2d 1100; *Comptroller of the Treasury v. Equitable Trust Company* (1983) 464 A.2d 248.) It is quite clear that – regardless of any issue of tangibility versus intangibility -- under section 995 and Rule 152, computer storage media in the State of California are to be taxed at their full value inclusive of all installed "basic operational programs." Given this, there apparently is no basis under California law other than section 995 for exempting installed "application programs." As a consequence, there should be no legal impediment to assessing storage media to which section 995 is inapplicable.

Question No. 2

In calculating cost-based indicators of value for special purpose equipment such as microprocessor-controlled telephone switches containing embedded systems, should the Valuation staff include the total cost of placing such equipment into productive use, including the cost of the software in the storage media in the embedded systems?

My response to this question is based to the reasoning set forth above. One, in my opinion the so-called "application software exemption" set forth in section 995 does not apply to such equipment. Two, under Property Tax Rule 6, "The Reproduction and Replacement Cost Approaches to Value," the costs utilized include those "typically incurred in bringing the property to a finished state." Presumably, a telephone switch that has been designed to operate under the control of embedded systems must have such embedded systems – and the software on the storage media therein – in place in order to function productively and be utilized as a switch. Accordingly, under our Rule 6, such software costs must be included in the calculation of the replacement or reproduction cost value of the switch.

---

[8] In any event, neither the Legislature in adopting section 995, nor the Board in adopting Rule 152 appear to have taken special purpose equipment into consideration or indicated how the operational/application dichotomy might apply in that context.

Conclusion

The issues addressed in this memorandum are of first impression; they have never been addressed by either the Legislature, the Board or a court. Nevertheless, based upon the analysis and reasons set forth above, it is my opinion that section 995 only applies to the valuation of the storage media present in general purpose computers such as mainframe computers, mini-computers, and desktop computers. Thus, special purpose equipment such as microprocessor-controlled telephone switches should be valued without regard to either section 995 or Property Tax Rule 152. In other words, storage media embedded in special purpose equipment should be valued inclusive of the software on such media; or, stated another way, by assuming the presence of such software on the media. Accordingly, under Property Tax Rule 6, cost-based indicators of value for special purpose equipment should be calculated so as to include the costs of placing the equipment into productive use, including the cost of the software in the storage media in the embedded systems.

RWL:jd
h:/property/precednt/valuādiv/2000/01rwl

cc: Mr. Dick Johnson – MIC:63
Mr. David Gau – MIC:64
Mr. Don Jackson – MIC:61
Ms. Jennifer Willis – MIC:70
Mr. Larry Augusta
Mr. Ken McManigal

995. **Storage media for computer programs.** Storage media for computer programs shall be valued on the 1972 lien date and thereafter as if there were no computer program on such media except basic operational programs. Otherwise, computer programs shall not be valued for purpose of property taxation.

As used in this section, storage media for computer programs may take the form of, but are not limited to, punched cards, tapes, discs or drums on which computer programs may be embodied or stored.

As used in this section, a computer program may be, but is not limited to a set of written instructions, magnetic imprints, required documentation or other process designed to enable the user to communicate with or operate a computer or other machinery.

History.—Added by Stats. 1972, p. 385, in effect June 23, 1972. Stats. 1973, Ch. 990, p. 1906, in effect January 1, 1974,substituted ‘‘lien date and thereafter’’ for ‘‘and 1973 lien dates’’ after ‘‘1972’’ in the first sentence; and Sec. 5 of the act provides no state payment to local government because of the act.

Note.—Stats. 1972, p. 385, provided: It is the intent of the Legislature that storage media, except basic operational programs, for computer programs shall be valued as if it had no computer program placed on it, except any basic operational programs. The Legislature recognizes that it is not in the public interest to value storage media for computer programs except as provided above. Basic operational programs, like law books or other standard reference books, have value which is measurable, but any other programs, like an attorney’s brief, an engineer’s calculations, or business records would be highly speculative.

It is the intent of the Legislature that only those basic operational programs which are presently being assessed and taxed in the various counties continue to be assessed and taxed during the effective period of this act. The value of other computer programs is not now subject to property tax, was not intended to be subject to property tax and shall not be subject to property tax, either directly or indirectly or through the inclusion of the value of such computer programs in evaluating related storage media for computer programs. Taxation of these expressions of creativity would be detrimental to research and an expansion of business activity within the state.

Rule 152. COMPUTER PROGRAM STORAGE MEDIA.

Reference: Article XIII, Section 2, California Constitution; Sections 110, 401, 995, 995.1,995.2, Revenue and Taxation Code.

(a) Computer programs shall not be valued for purposes of property taxation, except with respect to the valuation of storage media as provided in section 995 of the Revenue and Taxation Code. A licensor of a computer program who does not own, claim, possess or control the storage media on which the program is embodied or stored shall not be subject to assessment with respect to the value of the licensor's copyright interest in the computer program, or with respect to the value of the license fees charged for the use of the computer programs.

(b) Storage media for computer programs, as defined in section 995 of the Revenue and Taxation code, shall be valued as if there were no computer program on such media except basic operational programs.

(c) In accordance with Revenue and Taxation Code Section 405, storage media for computer programs shall be assessed to the person owning, claiming, possessing or controlling the storage media on the lien date. Storage media shall not be assessed to the owner of the copyright in the computer program embodied or stored on the media if the owner of the copyright does not also own, claim, possess or control the storage media subject to assessment.

(d) The term ''basic operational program'' refers to a ''control program,'' as defined in section 995.2 of the Revenue and Taxation Code, that is included in the sale or lease price of the computer equipment. A program is included in the sale or lease price of computer equipment if (i) the equipment and the program are sold or leased at a single price, or (ii) the purchase or lease documents set forth separate prices for the equipment and the program, but the program may not be accepted or rejected at the option of the customer.

(e) In valuing computer equipment that is sold or leased at a single price not segregated between taxable property and nontaxable programs as defined in section 995.2 of the Revenue and Taxation Code, the assessor, lacking evidence to the contrary, may regard the total amount charged as indicative of the value of taxable tangible property.

(f) A person claiming that a single-price sale or lease includes charges for nontaxable programs and services should be required to identify the nontaxable property and services and supply sale prices, costs or other information that will enable the assessor to make an informed judgment concerning the proper value to be ascribed to taxable and nontaxable components of the contract.

(g) When the nontaxable components of a package composed of computer hardware, basic operational programs and nontaxable programs and services may be accepted or rejected at the option of the customer and the charge for each is itemized, such itemization constitutes evidence of the value of the component. Prices charged, whether at the wholesale or the retail

level, for hardware only or hardware and basic operational programs also constitute evidence of the value of such property that may be used in segregating values when taxable and nontaxable properties or services are covered by a single-price contract.

(h) Examples

(1) Example 1 (Personal Computers).

Included in the price of every IBM and IBM compatible personal computer and every Apple and every Apple compatible personal computer is a basic input output system (BIOS). BIOS is a copyrighted computer program that controls basic hardware operations, such as interactions with diskette drives, hard disk drives and the keyboard, and that facilitates the transfer of data and control instructions between the computer and peripherals. The operation of other computer programs, such as the various versions of Disk Operating Systems (DOS), Windows, OS/2, UNIX and similar programs, is possible only through the facilities provided by BIOS, but operational programs other than BIOS are not in themselves fundamental and necessary to the functioning of the computer.

(2) Example 2 (Mainframe Computers).

Included in the price of the IBM mainframe computers is a license to use IBM's Licensed Internal Code (LIC) on the computer. LIC is a set of copyrighted computer programs (commonly referred to in the computer industry as microcode) that include the programs that implement the basic functions of the mainframe computer and operate the control logic necessary to execute user instructions to the computer. Manufacturers of other computers likewise include in the price of their computers the microcode necessary to implement the basic functions of the computer. The operation of other computer programs is possible only through the facilities provided by microcode, but operational programs other than microcode are not in themselves fundamental and necessary to the functioning of the computer.

History: Adopted September 14, 1972, effective October 19, 1972.
Repealed Old Rule and Adopted New Rule February 21, 1974, effective February 26, 1974.
Amended July 24, 1996, effective November 3, 1996.